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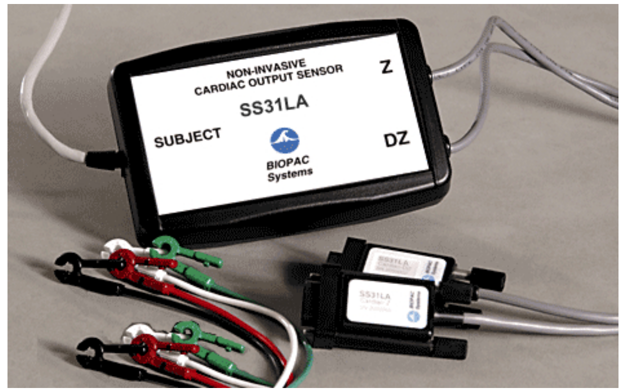
SS31LA NONINVASIVE IMPEDANCE CARDIOGRAPHY MODULE



The SS31LA records the thoracic impedance parameters associated with Cardiac Output measurements. The SS31LA incorporates a precision high-frequency current source, which injects a very small (2 mA rms) current through the measurement tissue volume defined by the placement of a set of current source electrodes. A separate set of monitoring electrodes then measures the voltage developed across the tissue volume. Because the current is constant, the voltage measured is proportional to the characteristics of the biological impedance of the tissue volume. The SS31LA outputs impedance (*Z*) and derivative of impedance (*dZ*) in real time.

- Use with a 8-spot electrode lead configuration
- Use the SS31LA to measure changes in Cardiac Output under a variety of conditions: laying down, sitting up, standing up, and post-exercise.
- Use on stationary subjects; the SS31LA is sensitive to motion artifact.
- See BSL *PRO* Lesson **H21 Impedance Cardiography** for sample SS31LA setup and data.

Specifications

Outputs:	
Impedance (*Z*)	(50 mV = 100 Ω)
Derivative Impedance (*dZ*)	(5 mV or 2 Ω/sec)
Operational Frequency:	100 KHz sine wave
Current Level:	2 mA (rms)
Bandwidth: (can limit in BSL *PRO* software)	
Z:	DC – 100 Hz
dZ:	DC – 100 Hz
Dimensions:	14 cm (long) x 9.1 cm (wide) x 2.9 cm (high)
Weight:	400 grams

Electrode clip connects to standard snap electrode – use with an 8-spot electrode lead configuration

Note: SS31LA replaces the SS31L, which had lead connectors designed for strip electrodes, such as EL506, which were discontinued due to manufacturing limitations.

Usage Statement

Bioimpedance methods to perform stroke volume and cardiac output measurements via application of electrodes on the neck and torso are considered by BIOPAC to be research and educational tools. Historically, there have been numerous research efforts to measure stroke volumes and cardiac outputs using bioimpedance techniques. The performance of these systems is subject to evolving algorithms. New bioimpedance methods, such as TransRadial Electrical bioimpedance Velocimetry (TREV) are examples that show new promise in this area. Additionally, machine learning strategies are beginning to accommodate the variabilities of bioimpedance methods due to electrode type, placement, body position, movement artifacts, and electrical signal filtering. Research is ongoing as bioimpedance techniques offer profound non-invasive advantages compared to thermodilution and similar "gold-standard" historical methods for measuring stroke volume and cardiac output. BIOPAC is committed to continue to offer educational and research solutions for the application of bioimpedance methods to measure cardiovascular parameters despite the present "state of the art" showing these measures to be generally more useful for determining relative changes versus absolute values.